

Real People – Real Stories

Maple Hill, NC (Pender County)



Exchange Project
BECAUSE OUR ENVIRONMENT AFFECTS OUR HEALTH

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Significance of Case

Hurricane Floyd devastated eastern North Carolina in September of 1999, damaging or destroying approximately 20,000 uninsured homes (Solow, 2004) and inflicting \$6 billion in damages (Feagans, 1999). Communities of color and economically disadvantaged areas were disproportionately affected by the hurricane and associated flooding (Guidry & Margolis, 2005), and they faced greater barriers to receiving disaster relief funds than their wealthier counterparts (Solow, 2004).

A decade after Hurricane Floyd struck in 1999, the community of Maple Hill is still feeling the after effects of the flooding (Solow, 2004). Despite the enormous amount of aid sent to eastern North Carolina,¹ only a small portion of these funds reached the town (Cantwell, 2001; Feagans, 2000b; Mack, 2005; Solow, 2004). Now those resources have been exhausted, and residents remain concerned about health effects resulting from houses damaged by flood waters and contaminated by mold and mildew.

Community History

Maple Hill is a small, unincorporated town in rural Pender County, North Carolina. Pender County is a coastal county in southeastern North Carolina. In 2003, Pender County had a population of 43,527 residing in its 871 square miles and was 73% White and 24% Black (United States Census Bureau, 2005). When Hurricane Floyd struck in 1999, 14% of the county fell below the national poverty line, and the median household income was almost \$36,000 (United States Census Bureau, 2005).

Maple Hill, with a population of approximately 2500 (Cities America Inc, 2005), was less affluent than other parts of the county. For example, Topsail Beach, a coastal town in Pender County, had a median household income of \$55,750; however, Maple Hill's median household income was just over \$30,000 (Cities America Inc, 2005; Dedman & Doig, 2005). Maple Hill also had a higher proportion of people of color: the town was 52% White and 46% Black (Dedman & Doig, 2005).

"Maple Hill . . . was a small community, but it was a powerful community. People stuck together. But it seemed like the flood caused a lot of problems in the community, a lot of deaths and illnesses. I don't guess it will ever be the same."

-Community Member

¹ The North Carolina legislature allocated \$836.6 million of disaster relief funding (Solow, 2004). As of 2002, \$300 million dollars of that money was unspent, and the state budget reallocated those funds for other purposes (Jones, 2002).

Most of the families in Maple Hill have lived in the community for generations. As one community member explained, “Most of us are here because our kin folks were” (Talton, 2004b). Many of the Black residents are descendants of freed slaves (Talton, 2004a), and these families tend to live in specific parts of the town. A lifetime resident of Maple Hill explained that “the majority of Black residents live to the east of Moore’s Creek, while Whites live on the west side of the creek” (Talton, 2004a).

Pender County is primarily rural.² Many residents keep livestock as a means of livelihood, and many areas in the county still rely on the use of well water and septic tanks. Maple Hill is 18 miles from the nearest centralized water waste treatment plant, and homes have not been connected with public sewage systems and continue to rely on septic systems. Many of these septic systems are outdated and would not meet current standards for septic systems (NCRCAP, 2005).

Hazard

In the United States, floods are second only to fire as the most common natural disaster that threatens human life (Federal Emergency Management Agency (FEMA), 2004). Floods are also the top cause of property damage in the nation (Feagans, 1999).

Community members blame the extreme flooding³ that has hit Eastern North Carolina in recent years on a variety of causes, including development of wetlands, failure to maintain free flowing waterways, and deforestation. Between the mid-1970s and mid-1980s, the North Carolina lost an estimated 1.2 million acres of wetlands (Habitat Conservation Program, n.d.). Wetlands are important because they act like a sponge during heavy rains, absorbing water and preventing flash flooding (US EPA, 2006). Roads and houses built on low-lying wetlands in the past decades have changed the hydrology of land and reduced its ability to absorb excess water. In Pender County, Interstate 40 was constructed in 1991, just eight years before Hurricane Floyd. Dr. Curtis Richardson, the Director of Duke University’s Wetland Center explained the negative effect of the construction of I-40,⁴ saying, “Under storm events you can get several feet of water backing up. In the coastal plain, of course, there’s nowhere for the water to go” (Feagans, 2000a). Maple Hill community members also ascribe flooding to blockages in the creeks and rivers caused by uncontrolled beaver populations and failure to clean out waterways (Maple Hill

² Almost all (99%) of Pender County’s land is zoned for rural agriculture (Scott, 2003a).

³ Between 1990 and 1999, there were 10 federally declared disasters related to hurricanes and flooding in North Carolina, as compared to 4 during the 1980s, 3 during the 1970s, and 3 during the 1960s (Federal Emergency Management Agency (FEMA), 2007).

⁴ A culvert is a drain crossing under a road.

resident, personal communication, 2008). Blame for the flooding is also attributed to deforestation because this removes trees that would otherwise absorb high amounts of water and prevent soil erosion (SOHP, 2004d).

People of low income, particularly people of color, are especially vulnerable to flooding. Research has demonstrated that people of low income are more likely to live in flood-prone areas than more affluent people because these areas often have lower property values (Lee, n.d.). There are also historical reasons for the concentration of African Americans in floodplains. After Emancipation, former slaves who chose to remain in the South had few options as to where they could live and work. Those who moved from their former homes tended to settle in areas that were of less interest to white landowners, namely low-lying land in the floodplains. These areas were often open to new development because they had been cleared of other structures by past floods. During Reconstruction, some people in these African American communities were able to buy the title to their land. Later, advocates of segregation reinforced the existing division of land by crafting laws that maintained the segregation and through violence against African American families who attempted to live in areas where most of the property was owned by white people (Mobley, 1986).

In addition to being more likely to live in areas vulnerable to flooding, low-income residents are less likely to have flood insurance (Feagans, 1999). Sometimes this is a result of erroneously believing that homeowner's insurance covers flooding, lacking a clear title to property, not realizing that the house is on a floodplain, or being unable to afford the premium (Feagans, 1999; McGrath, 1999a).⁵ In other cases, people outside the 100-year floodplain believe that they are safe from a major risk of flooding or are even advised by their insurance agents that flood insurance is unnecessary (Feagans, 1999).

In the case of Maple Hill, outdated floodplain maps were also blamed as the source of community insurance woes. At the time of Hurricane Floyd, the 100-year floodplain⁶ maps in Pender County dated back to 1985, despite requests for updated maps from Pender County officials to the Federal Emergency Management Agency (FEMA) in 1996, three years prior to Hurricane Floyd (Feagans, 1999). Although FEMA generally updates maps every five years, they are under no obligation to do so, and they denied Pender County's request

⁵ Flood insurance is provided through a federally-run program. People inside the 100 year floodplain are required to buy coverage if they wish to be eligible for a federally insured mortgage; those outside may opt to purchase coverage. The average cost of flood insurance in the US in 1999 was \$342 per year for \$120,000 in coverage (Feagans, 1999).

⁶ The year of a flood plain map denotes a scientific estimate of the number of years between floods. For example, if an area lies within the 100 year flood plain, scientists estimate that area will flood once every 100 years. In an area within the 500 year flood plain, scientists estimate the area will flood once every half millennium (Feagans, 1999).

due to resource shortages. For their part, FEMA officials urge people not to make insurance decisions based on the floodplain maps (Feagans, 1999).

The hazards of floods are both immediate and chronic. Immediate hazards can include death from drowning, infectious diseases spread by mosquitoes that breed in stagnant water, well and surface water contamination by sewer overflow and dead animals, and destruction of property. The long term effects of floods can be felt for years and include property damage, respiratory illnesses due to poor air quality from molds and dampness, and psychological effects such as post traumatic stress disorder (Federal Emergency Management Agency (FEMA), 2004).

Immediate Effects

In September 1999, Hurricane Floyd dropped over 20 inches of rain on the eastern regions of North Carolina. More than 48,000 people were forced out of their homes and into shelters (Thompson, 2001), and 30,000 jobs were lost as a result of the flooding (North Carolina Floodplain Mapping Program, n.d.). More than 50 deaths were directly attributed to the storm, the majority due to drowning. Between September 16 and October 27, 1999, emergency department surveillance⁷ reported there were over 59,398 visits: 65% were illness related,⁸ and 33% were injury related (North Carolina Division of Water Quality: Environmental Sciences Section, 2000).

In Pender County, the floodwaters created by this rain rose above the 500-year floodplain (Feagans, 1999). Many illness-related emergency department visits were attributed to the stagnant water that remained in much of Pender County after the flood. Wells, creeks, and rivers were contaminated by dead livestock, chemical and petroleum spills, and raw sewage, including animal waste from Confined Animal Feeding Operations (CAFOs).⁹ In a December 1999 interview for the Southern Oral History Project,¹⁰ one flood survivor explained:

I think that the major problem with the devastation was not really the water but the

⁷ Emergency department surveillance was established at 20 hospitals in 18 flood affected North Carolina counties (North Carolina Division of Water Quality: Environmental Sciences Section, 2000).

⁸ Leading causes of illness-related visits were respiratory illness, gastrointestinal illness, and cardiovascular disease. Compared to other years, there was a statistically significant increase in suicide attempts, dog bites, and fevers in the first week following the hurricane (North Carolina Division of Water Quality: Environmental Sciences Section, 2000).

⁹ Confined animal feeding operation (CAFO) are 'large-scale animal production facilities where many animals are raised or maintained, where feed is brought to the animals, and where wastes accumulate in a small area' (TNDA, 2006).

¹⁰ Since 1973, the Southern Oral History Project (SOHP) has worked "to foster a critical yet democratic understanding of the South - its history, culture, problems, and prospects" (Southern Oral History Project, 2005).

actual contaminants that were in the water. Used to be when they had floods . . . the water would recede and people could go and pick their crops and no problems. But now everything is so contaminated. The contamination is still here. Wells are still contaminated. . . . There's been a lot of illness in the community, a lot of sickness, a lot of sores that won't heal, a lot of upper respiratory problems (SOHP, 2004d).

Drowned animals were one source of water contamination. At least 20,000 hogs and 600,000 chickens and turkeys¹¹ died in the flooding, and their carcasses could not be burned or buried immediately (Shiffer, 2000). Some farmers tried to save their livestock by releasing them from enclosed areas. Many of these animals still drowned, and their bodies were spread across the countryside (SOHP, 2004b).

Raw sewage was another source of water contamination. The heavy rain caused the livestock excrement holding ponds or "lagoons" of more than 40 CAFOs to overflow (Shiffer et al., 1999; Wing, Freedman, & Band, 2002). This flooding spilled millions of gallons of animal waste into waterways, killing much of the freshwater marine life in the creeks and rivers leading to the ocean (Schmidt, 2000; Shiffer, 2000; Tietz, 2006). In addition, human sewage escaped from at least 24 wastewater treatment plants (Shiffer, 1999) and an untold number of residential septic tanks, many of which were already in poor condition.¹² The waste spread to the soil, surface water, and ground water (NCRCAP, 2005). Communities also had to contend with chemical contamination from propane tanks, underground gas storage tanks, industrial complexes, and private homes (Shiffer, 1999).

After the flooding, hundreds of single-family and mobile homes were deemed uninhabitable. Hurricane Floyd became North Carolina's most costly natural disaster with property damage exceeding \$6 billion (Feagans, 1999). In addition to the immediate damage of the flood, the number of households in Pender County relying on food stamps more than doubled between August and October 1999.¹³ This number excludes those

¹¹ These are the most conservative estimates provided by newspaper articles. Estimates of the number of hogs that drowned in the flooding range from 20,000 (Shiffer, 2000) to 40,000 (Allegood, 1999) to 100,000 (Shiffer, Wagner, & Shelman, 1999) to 110,000 (Eisley, Shiffer, & Jones, 1999). Estimates of the number of poultry killed by flooding range from 600,000 (Allegood, 1999) to 1 million (Eisley et al., 1999) to more than 2.5 million (Shiffer, 2000).

¹² During flooding, water in the soil prevents the anaerobic conditions necessary for decomposition of waste to occur in the system and eventually the system may be back up or floodwaters may carry away the effluent. A septic system that is already in poor condition is particularly prone to malfunction during flood conditions. The cost of replacing a septic system can be formidable, particularly for low income families, ranging from \$3,000 to \$30,000 (B. Taylor, personal communication, 2006).

¹³ In August of 1999, almost 3,000 people were relying on food stamps in Pender County. This number increased to 6,116 people in October, a 104% increase. This figure excludes one-time access to food stamps after the storm, suggesting that the increase was due to the long-term disablement of many people's livelihoods (McGrath,

households provided one-time emergency needs immediately after the storm (McGrath, 1999b), suggesting that for thousands of families in the county, Hurricane Floyd contributed to long term financial difficulties.

Long Term Effects

Often the effects of floods are not fully realized until long after volunteer and government assistance have ceased (Federal Emergency Management Agency (FEMA), 2005). The long term effects of Hurricane Floyd continue to trouble the town of Maple Hill.

Water damage that initially appears mild may lead to long term structural damage of buildings and contribute to poor health, sometimes years later (Scott, 2002; Solow, 2004). Dampness in walls and insulation contributes to increased allergens from cockroaches, dust mites, mold spores, other microbiological agents, and the organic chemicals that are released from degrading building materials (Amr, Bollinger, Hamilton, Weiss, & Rossman, 2003; Bornehag et al., 2004; Gold et al., 1999; IOM, 2000; Jacob et al., 2002; Krieger et al., 2002; Taskinen et al., 1999; Tortolero et al., 2002). These factors result in respiratory problems, such as coughing or asthma,¹⁴ and contribute to the growth of mold and mildew (Bornehag et al., 2004; Dijkstra, Houthjuijs, Brunekreef, Akkerman, & Boleij, 1990; IOM, 2000; Taskinen et al., 1999; Yang, Meng-Chiao, & Kuang-Chi, 1998).

Mental health impacts are also a concern for survivors of a natural disaster. In particular, posttraumatic stress disorder (PTSD) is commonly seen in survivors who have witnessed or experienced flood events (APA, 2005). Symptoms include flashbacks, diminished emotions, decreased contacts, explosive irritability, nightmares, and insomnia (APA, 2005). PTSD can persist for many years.

PTSD can contribute to other mental health conditions including depression, substance abuse, and memory problems (APA, 2005).

These long term effects have now become evident in Maple Hill. Homeowners complain of the mold that grows on their walls and in air conditioning ducts (Solow, 2004). Building

“When they first came in, they said our home was damaged 50%. We never got any help. We had mold, but we just had to try to wash it down ourselves, the best we could, but I’m sure there’s still mold in there.”
-Community Member

“There’s a lot of things happening because of Hurricane Floyd that we had never experienced before. We had a lot of people that passed away, young people and some old people. People . . . die but it seemed like after Hurricane Floyd came through . . . it’s like it had some disease behind it.”
-Community Member

1999b). As of 2005, the percent of people living on food stamps in Pender County is 8.7% or 3,787 people (NC Rural Economic Development Center, 2005; United States Census Bureau, 2005).

¹⁴ Furthermore, asthma is associated with rhinitis, sinusitis, depression, and anxiety disorders (Galil, 2000; Kabra & Lodha, 2004; Katon, Richardson, Lozano, & McCauley, 2004; Ortega, Huertas, Canino, Ramirez, & Rubio-Stipec, 2002).

foundations are crumbling, and moisture within the structures of homes has caused floors to buckle and walls to warp and pull away from frames (Bauer & Holland, 2005; Scott, 2002; Solow, 2004). Residents express concerns about their health and some report frequent visits to the hospital for recurring breathing problems (Solow, 2004). Community members describe significant psychological impacts as a result of loosing homes and possessions and watching community members scatter in the aftermath of the flood (SOHP, 2004a). Almost two years after the flood, one health worker observed that psychological effects from Hurricane Floyd were still prevalent in the community (SOHP, 2004c).

Response

Immediate Response

Most government and volunteer response to the needs of Maple Hill and Pender County after Hurricane Floyd focused on the immediate after effects. Although more than 400 roads were impassible immediately after the hurricane due to flooding (Shiffer et al., 1999), relief workers began to arrive in Maple Hill within a few days of the hurricane (Solow, 2004). The North Carolina State legislature allocated \$836.6 million to disaster relief funding for Hurricane Floyd (Solow, 2004).

The Federal Emergency Management Agency (FEMA) provided information and encouraged residents to register with them to determine eligibility for assistance. One flood survivor reported that FEMA provided temporary housing in the form of trailers to people who did not have homes and made \$10,000 grants available to help fix those homes that were eligible due to their flood insurance (SOHP, 2004b).

Clean up and reconstruction efforts relied heavily on volunteers. In the year after the hurricane, an estimated 61,277 volunteers provided 764,114 hours of labor in the North Carolina flood zone (State of North Carolina, 2000). In recognition of the impact of Hurricane Floyd on African American communities, the state recruited students from historically black universities in North Carolina to provide targeted outreach services to these communities (Solow, 2004). The North Carolina State Emergency Response Team (SERT) helped in clean-up and immediate relief after the flood. They were assisted in removing debris from yards and homes by the United States National Guard, the Marine

"After the hurricane . . . they moved a lot of [people] out of our community. They forced most of them because they would get no grant if they didn't move, and they put them in other locales. . . . I know 15 or 20% if not more had to move out. Residents that had been here maybe 40, 50, 60, 70 years, they had to move out. . . . That was a blow for us in the community."

- Community Member

Corps, Interfaith Church Groups, the Mennonites, the Salvation Army, and the American Red Cross (SOHP, 2004a; 2004b). Triangle United Way garnered over 1.2 million dollars in grants from donors. These funds helped to purchase cots for people still living in shelters, replenish the five million pounds of food distributed by the North Carolina Food Bank, provide building supplies to many Mennonite volunteers who came to the county after the hurricane in order to help build new homes for the sick and elderly, and purchase furniture and appliances for many of the flood survivors (Paisley, 2000).

Disaster relief efforts faced some challenges. Cases were reported of federal employees providing misinformation. One relief volunteer recounted FEMA officials inaccurately telling members of the Latino community that they could not receive help if they were undocumented (SOHP, 2004e). Additionally, confusion about questions on the application contributed to some residents' inability to receive government aid. For instance, people in Maple Hill reported not receiving grants or temporary housing trailers because when FEMA officials asked if they had someplace to live, they would answer, "yes," even if they were staying with multiple other families in a small space, because they did not understand that this question referred to permanent, rather than temporary, housing (Williams, 2002).

Low-income landowners faced barriers to receiving recovery aid. They were more likely to lack a clear title to their land, even if they had been living on it for generations.¹⁵ In addition, many were hesitant to assume financial obligations, such as government loans, that they did not have the means to pay (Solow, 2004).¹⁶ To complicate the situation, some flood victims found that loans and grants offered by the government were considerably less than the amount necessary to complete renovations (McGrath, 1999a).¹⁷

In addition, administrative problems plagued the disaster relief process. Flood victims stated that their applications were repeatedly lost (Feagans, 2000a; Scott, 2002) or that they received conflicting information from inspectors (McGrath, 1999a). Others were excluded from programs because their income was too high or because they missed a deadline for filing paperwork (Scott, 2002; Solow, 2004). For their part, local officials were forced to deal with a lack of funds available to administer programs, constantly changing

¹⁵ Lacking a clear title to the land is a common problem in rural, low income communities where land has been inherited through many generations. In the case of African American communities that settled on land during Reconstruction, legalized racism contributed to a lack of clear land title. Poverty may perpetuate the problem by limiting the ability of families to access attorneys who can help to resolve the situation. Approximately one-third of rural land owned by Black families is considered *heirs' property*; that is to say that it is passed on without a formal will and sometimes without a title (*Crossing a great divide: Black, white, and green.*, 2007).

¹⁶ This concern was not unfounded given that 30,000 people lost their jobs as a result of the hurricane (North Carolina Floodplain Mapping Program, n.d.). By 2004, Pender County reported to the state that it planned to foreclose on 13 of the 95 properties bought with federal monies for hurricane relief (Solow, 2004).

¹⁷ For example, one couple recounted being offered a loan for \$57,000 from the Small Business Administration, while contractors estimated that repairs would cost \$84,000 (McGrath, 1999a).

rules guiding the disaster aid system, and applications being handled by outside contractors, all of which added to the complexity of the situation and local officials' frustration (Solow, 2004). For example, in 2001, the state hurricane relief effort, which had up to that time been administered by the NC Department of Commerce, came under oversight of the Department of Crime Control and Public Safety, and there were changes in rules governing the program (Rouch, 2001).

At the state and federal levels, available monies were shrinking, and the structure of funding dispersal increasingly favored more politically-connected municipalities. As of 2004, the federal government had cut federal disaster relief funding by half. This dearth of funds left communities such as Maple Hill to compete for scarce relief dollars with larger, more affluent communities on the coast, which had also been impacted by the hurricane (Solow, 2004).

The seemingly slow response of the government frustrated many citizens. On September 19, 2000, Representative Wright of the 98th NC House District sent a letter to the State Health Director Dennis McBride after attending a community meeting where residents complained of illnesses resulting from water contamination and mold in their

"I know that there were funds that came into the county, but people did not benefit, not in this area. . . . Congresswoman Meyers from Charlotte, she came in and she donated some trailers. . . . I think it was supposed to be 22 or something like that, that she donated to the community because of the flood. But when they got through with those trailers, the community might have got about 10. And they said that when stuff come in like that, I guess the commissioners, they make the decision."

- Community Member

homes (Rouch, 2000). He wrote that Pender County had "an embarrassing and unacceptable lack of response by public health officials to the health-related and environmental needs of Hurricane Floyd victims" (Rouch, 2000). County Manager Martin Beach defended the public health response in Maple Hill, stating that Pender County had conducted more than twenty health-related visits to Maple Hill since the hurricane, more than to many other communities in Pender County. The visits had included health screenings, allergy assessments, and door to door health surveys.

He also pointed out that of nine private wells that were tested in Maple Hill, only one had tested positive for contamination to date (Rouch, 2000). Maple Hill residents noted that they had not been apprised of visits or informed of the results of testing (Maple Hill resident, personal communication, 2008). However, residents reported that state health officials maintained a presence in the county after the August Maple Hill community meeting and the letter from US Representative Wright (Rouch, 2000).

Long-Term Response

Government efforts to alleviate the effects of Hurricane Floyd's flooding continued into subsequent years. In 2003, Pender County received \$200,000 from the state to supplement a \$400,000 crisis housing grant that would repair and replace over 500 homes in the county (Solow, 2004). Because these funds were for the entire county, much of the money was spent outside of Maple Hill. In the five years after Hurricane Floyd, 83 homes in Maple Hill were repaired, rebuilt, or bought out (Solow, 2004). Approximately 100 homes in Maple Hill were still in need of flood-related repairs as of 2006, and structural problems and dampness still persist as a health risk in many homes (L. Williams, personal communication, 2006).

In addition, federal government agencies created buy-out programs to permanently relocate people living in the flood plain (SOHP, 2004b).¹⁸ Designed to compensate homeowners in flood-prone areas for the cost of their property, these programs required that residents move to areas not in the floodplains. The former homesteads were then converted into land where residential development was restricted (Feagans, 2000b). Significant pressures existed to participate in buy-out programs. For example, one resident was offered only \$1,500 for repairs to his severely flood damaged home versus \$108,000 to sell his homestead in the buy-out program (Maple Hill resident, personal communication, 2008). Moreover, a reticence to use buy-out programs created barriers to accessing other kinds of relief. Darlene Adams, director of the NC Housing Recovery Center in Pender County, explained that people who did not apply for government buy-outs were not eligible for other relief programs (Feagans, 2000b). The pressure to take part in buy-out programs and the disparity between funds available for buy-outs as compared to repairs led to a suspicion among some Maple Hill residents that available monies were being withheld from the community as a means to gain control of land¹⁹ or due to disinterest in helping the community improve itself (Maple Hill resident, personal communication, 2008).

Deep roots in the community prevented some residents from taking advantage of available government funds for buy-out programs. Flood victims struggled to decide whether to abandon property that had been in their families for generations, sometimes more than 100 years. For some community members, the prospect of moving added to the devastation that they had already faced during the flood itself. As one community member

¹⁸ Local governments do not always favor buy-out programs because they can decrease the tax base of the city or county. Residents may oppose the programs because they break up community structures or require giving up land that has been in the family for generations. State legislators have discussed rebuilding entire communities in new areas to address residents' concerns (Feagans, 2000b).

¹⁹ Maple Hill residents point out that flood zones have been redrawn several times in recent years and express concern that land designated as a buy-out zone may be re-designated and appropriated for lucrative development at a later time (Maple Hill resident, personal communication, 2008).

commented, "They want to take this land and tear this house down, and put me somewhere maybe I don't want to be. I'm too old to move now" (Cantwell, 2001). Applying for buy-outs ran counter to community wisdom: "Don't ever sell this property so you'll always have a place to lay your head" (Feagans, 2000b).

For those people who were willing to consider government buy-outs, other barriers awaited. Some found suitable property in nearby counties but were prohibited from spending funds outside of Pender County (Cantwell, 2001). Others were caught in lengthy bureaucratic processes and ultimately failed to receive funds. For example, when funding for auxiliary services like housing counselors and legal services was terminated in 2002, 16 Pender county residents who were waiting to resolve ownership issues were cut off from legal aid and, as a result, were unable to submit their applications for buy-outs before the program was closed (Jones, 2002).

"Some got help; some didn't get no help, and that's the way it worked, you know. There's not a whole lot you could do about it. A lot of them said they needed help and put in for it, but they were turned down, and there ain't a thing I could do about it."
- Community Member

Assistance from volunteer and community groups decreased significantly in years after the flood. Programs started by FEMA, SERT, and the Governor's Fund dissolved a few years after the flood. However, a few organizations continue to advocate alongside Maple Hill residents for housing relief, limits on the development of wetlands, and updated flood plain maps (Bauer & Holland, 2005). For example, in 2004, NC Fair Share²⁰ member Cindy Moore, a Maple Hill resident, helped to organize residents and take them by the busload to Raleigh to ask for help from state legislators (Solow, 2004). Other residents and members of NC Fair Share attended county commissioner meetings for a year to urge local government to apply for federal grants that could help to rebuild Pender County communities (Parker, 2005).

The experience of trying to continue reconstruction in the face of fast-dwindling funds created tensions between community members and county officials. Many residents of Maple Hill felt that available funds were going to areas with more political pull, such as more affluent coastal towns (Solow, 2004). For their part, county officials became exasperated by complaints from the community (Solow, 2004). In the midst of a struggle over allocation of relief funds, one commissioner told reporters, "Maple Hill has not been slighted at all; they just yell the loudest" (Mack, 2005).

²⁰ NC Fair Share is an organization that works on behalf of low income communities to advocate for a more equitable distribution of resources (Bauer & Holland, 2005). The Pender County Chapter was opened in October 1992. For more information please see <http://www.ncfairshare.org>.

Addressing environmental issues and minimizing future flood impact

Several steps have been taken to prevent future flooding in areas like Maple Hill and to address the potential causes of environmental contamination in the event of another natural disaster.

With growing recognition of the role of wetlands in flooding mitigation, federal and state governments have begun to regulate development of wetland areas. Protective legislation was first seen in the 1985 Federal Farm Bill, which included a “Swampbuster” section that laid out penalties for farmers who drain and clear wetlands. In 1996, the North Carolina General Assembly created wetlands restoration programs and strengthened laws protecting existing wetlands (North Carolina State University and A&T State University Cooperative Extension, 1997). In 1999, the North Carolina Attorney General announced that the state would begin strengthening enforcement of existing regulations, including criminal and civil penalties. As a result, North Carolina is currently classified as a state with “strong protection” for wetlands (Holman, 2003). These changes may not have taken place early enough to alleviate flooding from Hurricane Floyd, but they could help to lessen future flooding. Similarly, in past years the Army Corps of Engineers has developed techniques to mitigate the effects of flooding caused by highway construction through wetlands, such as installing larger culverts under highways, relocating residents, and building retention ponds to divert run-off (Schmitt, 2001). Additionally, the Duke Wetlands Center was funded by the Transportation Research Board to assess the effects of highway construction on wetlands and develop recommendations for minimizing negative impact on wetlands in future construction efforts (Basgall, 1998).

The North Carolina General Assembly also took action to update out-of-date flood maps so that residents of areas at risk for flooding could be made aware of their need for flood insurance. Recognizing that FEMA’s mapping budget was so limited that North Carolina could only count on receiving updates for one county each year, the assembly allocated \$23 million for the North Carolina Flood Mapping Project, and FEMA contributed another \$6 million for the project. The initial project was scheduled for completion in 2005 (North Carolina Floodplain Mapping Program, 2000).

Not all actions taken to reduce future flood damage were without controversy. For example, in Fall 2003, Pender County considered and approved rezoning of commercial and residential areas in the county, in part to prevent dense building in flood plain areas (Scott, 2003a; 2003b). Residents of Maple Hill were not pleased with the resulting lot size requirement because they believed that it reduced land value and their ability to subdivide

plots in order to pass them on to their children (Scott, 2003a).²¹ Additionally, rezoning based on flood plain designation inconvenienced some residents by restricting development of local businesses such as home day care centers (J. Jowett, personal communication, 2008).²²

Controversy also marked efforts to address flood contamination associated with CAFOs. Shortly after the flooding, lobbyists for the hog industry in North Carolina asked for exemptions from environmental regulations from the North Carolina legislature. This included a request for a one year exemption from the Clean Water Act, such that livestock farmers could release waste from lagoons into waterways without a permit (Rosen, 1999). Emergency rules were adopted in November 1999, allowing farmers to spray more than the usual amount of hog waste onto their fields (Associated Press, 1999). The Southern Environmental Law Center²³ sued the state over these emergency rules, stating that they would lead to unacceptable levels of run-off (Associated Press, 1999).

In 1999, the North Carolina legislature set aside \$5.7 million to buy out hog farmers in flood-prone areas and clean the lagoons on their properties. The state received twice the number of bids that it expected. However, most of the bidders were not the large, corporate-owned farms in Southeastern North Carolina, but rather small, independent farmers in the Northeastern part of the state (Shiffer, 2000). The state did buy out 15 hog farmers and in 2001 sought more funds to extend the buyout program (Feagans, 2001). In 2002, the Clean Water Management Trust Fund provided \$6.1 million to fund a second phase of buyouts (North Carolina Division of Soil & Water Conservation, 2002).

To address some of the environmental health issues associated with human waste management that occurred during Hurricane Floyd, the NC Rural Communities Assistance Project (NCRCAP)²⁴ began work to facilitate the replacement of failing septic systems in Maple Hill. NCRCAP believed that outdated septic systems, installed before county regulations existed, resulted in the poor drainage of waste water to surface and ground water. The group performed a door to door survey in Maple Hill to obtain water samples from wells and to ascertain which homes were using septic systems in compliance with current regulations. Because it was cost-prohibitive to try to hook Maple Hill to the

²¹ The original lot size discussed was two acres (Scott, 2003a). Ultimately, the county passed an ordinance stating that lots in flood zone could not be less than 20,000 ft², approximately 0.46 acres (J. Jowett, personal communication, 2008).

²² Pender County has an interactive GIS map on line showing old and new flood zones: [http://gis.pender-county.com/ConnectGISWeb/\(S\(qdcekh55lhuhjjmpjbss01j4\)\)/Default/Default.aspx](http://gis.pender-county.com/ConnectGISWeb/(S(qdcekh55lhuhjjmpjbss01j4))/Default/Default.aspx)

²³ The Southern Environmental Law Center is a non profit group of environmental attorneys that seek to protect the natural environment by working with state and local partners and providing leadership and legal advocacy (SELC, 2006).

²⁴ NC Rural Communities Assistance Project assists low income, rural communities as they address environmental health issues such as access to clean water, disposal of wastewater and solid wastes, and safe, affordable housing needs. For more information, please see <http://www.ncrcap.org/>

wastewater treatment plants 18 miles away, NCRCAP began to explore innovative alternatives, such as decentralized wastewater systems (NCRCAP, 2005).²⁵

In 2003, NCRCAP applied for an Unsewered Communities Grant from the North Carolina Rural Center with the purpose of installing a decentralized system serving 210 households in Maple Hill at a cost of \$3.4 million. Pender County cooperated by forming the Maple Hill Sewer District, and the Nature Conservancy and North Carolina State Parks agreed to allow their land to be used for the drainfield²⁶ (B. Taylor, personal communication, 2006).

Research

Minimizing future flood impact

In order to understand the need for sewer or updated septic systems in Maple Hill, the NC Rural Communities Assessment Project (NCRCAP) performed a door to door survey in Maple Hill to ascertain which homes were using wastewater treatment systems that failed to comply with current regulations. They also obtained water samples from wells. This information was used to support their application for a 2003 Unsewered Communities Grant (B. Taylor, personal communication, 2006).

To better understand the impact of highway construction on wetlands ecology, the Transportation Research Board provided more than half a million dollars in funding for research to the Duke Wetlands Center (Transportation Research Board, 2003). In 1998, Dr. Curtis Richardson, Director of Duke Universities Wetland Center, completed an eighteen month study on the drainage impact of the construction of Interstate 40 on Beaverdam Swamp. He found that the average height of water in the creek was seven inches higher upstream from the highway than it was downstream, indicating that the highway was a significant barrier to natural water flow and absorption. Dr. Richardson also found that culverts that run under the interstate acted as bottlenecks because they were not designed to handle the massive amount of water that can accumulate when events such as Hurricane Floyd take place (Feagans, 2000a). This research resulted in recommendations for minimizing negative impact on wetlands in future construction efforts (Basgall, 1998).

²⁵ Decentralized wastewater systems are septic or onsite systems that can serve a cluster of buildings and treat wastewater close to its source (US EPA, 2005). NRCAP partnered with the North Carolina American Water Works Association's Outreach committee to organize a workshop in August of 2005 for state and local government officials, Maple Hill community members and representatives from other stakeholder organizations. The workshop was an opportunity for engineers to discuss the potential for using decentralized wastewater treatment systems for communities such as Maple Hill (NCRCAP, 2005).

²⁶ A drainfield is an area of land (usually an open field) into which the sewage is dispersed by the septic system (North Carolina Rural Communities Assistance Project (NCRCAP), 1994).

Documentation of community experiences

From 1999 through 2003, Dr. Charles Thompson, researcher Leda Hartman, and doctoral candidate Katie Otis performed a series of interviews for the Southern Oral History Project (SOHP)²⁷ entitled "Voices After the Deluge: Oral History Investigations of the Great North Carolina Flood." These interviews portray life for many North Carolina residents after Hurricane Floyd. The series includes interviews with several state and county level officials including former Governor James Hunt. Stories of community experiences were also documented in a series of documentaries produced for public television by Donna Campbell, entitled "Hard Rain" and "Higher Ground." These documentaries describe the flooding related to Hurricane Floyd in Fall 1999 and detail related problems in Eastern North Carolina that continue to the present.²⁸

In September 2004, the *Independent Weekly* published the article "Cracks in the System" to remind readers of the problems that persisted in Maple Hill five years after Hurricane Floyd. It documented long-term health hazards occurring because of Floyd, such as mold and structural disintegration of homes resulting from water damage. The article documented the poor state of Maple Hill's houses and the effects on residents through photographs and personal stories (Solow, 2004).

"Our home is not by any means back to what it was. And it really has affected us, mentally, emotionally, and physically too, because I had never had any problems with allergies or respiratory problems, but both of us have them now."
-Community Member

Current status and updates

More than five years after Hurricane Floyd pounded the coast of North Carolina, life has still not returned to normal for many residents of Maple Hill. Despite the progress that has been made in rebuilding some homes and mitigating the effects of future floods, some flood victims still suffer from living in houses with mold and other water damage. The pace of development of wetlands has slowed thanks to new regulations, but previous destruction of wetlands has already damaged the buffer against future flooding.

Households in the floodplains still utilize well water and outdated septic tanks, thereby adding to the risk of well water contamination when another flood strikes. As of

²⁷ Since 1973, the Southern Oral History Project (SOHP) has worked "to foster a critical yet democratic understanding of the South - its history, culture, problems, and prospects" (Southern Oral History Project, 2005).

²⁸ More information about these documentaries may be found at: <http://www.unctv.org/hardrain/> & <http://www.unctv.org/higherground/>

June 2007, Maple Hill had received a \$2.7 million grant from the Rural Center to be used toward a decentralized waste water management system, but the community still had to secure the remaining \$700,000 (B. Taylor, personal communication, 2007).

While significant problems still exist, Maple Hill residents have not abandoned the fight to rebuild their community. Residents continue to attend county commissioner meetings to ask for remediation of remaining storm damage (L. Williams, personal communication, 2008). Moreover, Maple Hill residents have reached out to communities facing similar issues and have advocated for national policy solutions to help people in similar circumstances. For example, NC Fair Share member Haywood Mason represented Pender and nearby Bladen counties in a commission that visited New Orleans after Hurricane Katrina (L. Williams, personal communication, 2008). Similarly, NC Fair Share members in Maple Hill are working with the national organization Advocates for Environmental Human Rights to encourage Congress to adopt the United Nations Guiding Principles on Internal Displacement. The adoption of these principals would ensure US citizens the same rights to recovery afforded to vulnerable groups of people displaced by disasters in other countries (M. Roberts, personal communication, 2008; <http://www.ehumanrights.org/>).

As NC Fair Share Director Cindy Moore said, "We have heard that Hurricane Floyd is now part of history, that they are closing the book on it. But in our community, people are still suffering, still living with it" (Solow, 2004).

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